TETON CREEK RESORT (PWS 7410035)
SOURCE WATER ASSESSMENT FINAL REPORT

June 6, 2005

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for Teton Creek Resort, Well #1 and Well #2*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The Teton Creek Resort (PWS #7410035) has two wells, one main drinking water source well (Well #1) and one back-up source well (Well #2). Currently, the system serves approximately 100 people through 4 connections, according to the sanitary survey conducted in February 2005.

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other category(ies) results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, inorganic contaminants (IOCs, e.g. nitrates, arsenic), volatile organic contaminants (VOCs, e.g. petroleum products), synthetic organic contaminants (SOCs, e.g. pesticides), and microbial contaminants (e.g. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

In terms of overall susceptibility, both Well #1 and Well #2 rated high for IOCs, VOCs, SOCs, and microbial bacteria. Both wells rated high susceptibility for hydrologic sensitivity and moderate susceptibility for system construction. Land use rated high susceptibility for IOCs, VOCs, and SOCs and low susceptibility for microbial bacteria (Table 1).

According to the State Drinking Water Information System (SDWIS), no IOCs, VOCs, SOCs, or microbial bacteria have ever been detected in Well #1. There is no data in SDWIS regarding Well #2, so it is unknown if any IOCs, VOCs, SOCs, or microbial bacteria are present in that well's water.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the Teton Creek Resort, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). Actions should be taken to maintain a 50-foot radius circle around the wellhead clear of potential contaminants. Any contaminant spills within the delineation should be carefully monitored and dealt with. As much of the designated assessment areas are outside the direct jurisdiction of the Teton Creek Resort, collaboration and partnerships with state and local agencies should be established and are critical to success.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineation contains some urban and residential land uses. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil and Water Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies, please contact the Idaho Falls Regional Office of the Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR TETON CREEK RESORT, DRIGGS, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this assessment means.** Maps showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are included. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is included.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. EPA to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments for sources active prior to 1999 were completed by May of 2003. Source water assessments for sources activated post-1999 are being developed on a case-by-case basis. The resources and time available to accomplish assessments are limited. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The Teton Creek Resort (PWS #7410035) has two wells, one main drinking water source well (Well #1) and one back-up source well (Well #2). Currently, the system serves approximately 100 people through 4 connections, according the sanitary survey conducted in February 2005.

According to the State Drinking Water Information System (SDWIS), no IOCs, VOCs, SOCs, or microbial bacteria have ever been detected in Well #1. There is no data in SDWIS regarding Well #2, so it is unknown if any IOCs, VOCs, SOCs, or microbial bacteria are present in that well's water.

Defining the Zones of Contribution – Delineation

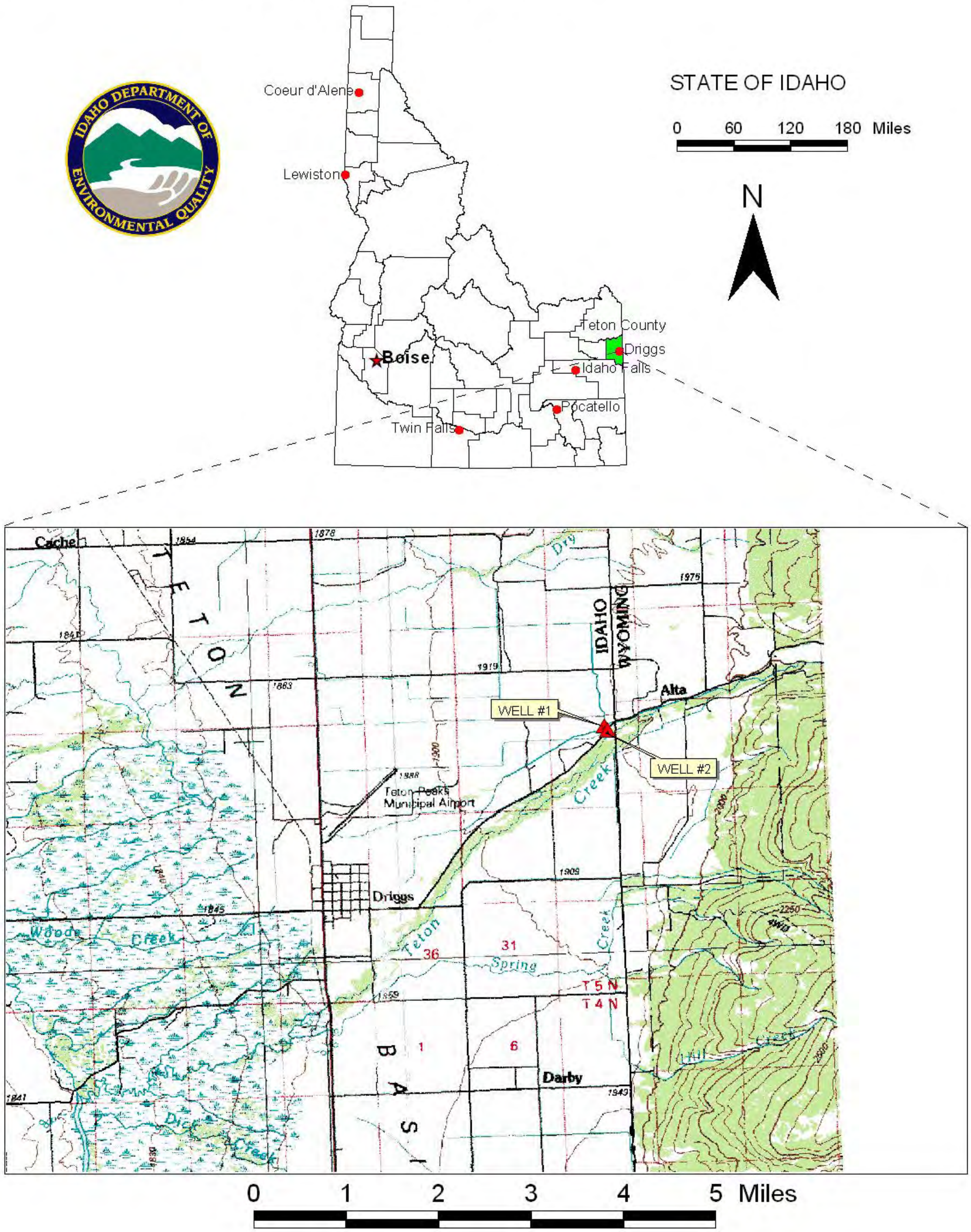
The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ performed the delineation using a computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Payette Valley aquifer in the vicinity of the Teton Creek Resort. The computer model used site-specific data from a variety of sources including local area well logs, and hydrogeologic reports (detailed below).

The well log for Well #1 indicates the upper 210 feet of the geologic material encountered by the well is sands, gravels, and clay. With the screened interval placed where it is, this material is the producing aquifer for this well. Below the alluvium are limestone, quartzite, and rhyolite formations that form the basement of the alluvial aquifer as well as the ridges that surround the region to the east. The geology of interest at the site is composed of alluvial sands, gravels and clays. The site is located at the eastern edge of the alluvial plateau in this region. The uplands to the east of the site were considered a source of water to recharge the alluvial aquifer.

The well log for Well #2 is very similar to the well log for Well #1. The entire 195 feet encountered by the well is gravels, sands and clay, including some boulders and cobbles. The producing zone for this well is from 136 feet below ground surface (bgs) to 195 feet bgs and is consistent with the alluvium aquifer associated with Well #1.

Ground water flow direction is generally from the east/northeast to the west/southwest, flowing out into the lower elevations from the uplands to the east. Water levels in surrounding wells indicate a relatively uniform and constant flow direction as conceptualized.

FIGURE 1 Site Vicinity Map of Teton Creek Resort



Model Description

DEQ delineated the capture zones for this report by using the WhAEM 2000, version 1.0.4. The model was run by inputting various ranges of parameters. Parameter estimations for wells were obtained from geologic maps, well logs, hydrogeologic knowledge of the area, and previous modeling studies. Boundary conditions were investigated and were placed in order to simulate the geologic controls of the area. Aquifer parameters were also investigated by running multiple trials until test point matches were considered appropriate.

The hydraulic conductivity was estimated based on the results of model simulations and test point matches. The aquifer thickness of 35 feet used in this model was taken from the screened interval of the source well. The screened interval of the well is 35 feet and was left constant throughout the modeling efforts. The recharge value used was 0.001 feet per day, or approximately 4 inches per year. This value is acceptable considering the area experiences approximately 18 inches of precipitation per year and there are numerous streams and canals that contribute water to the aquifer. The porosity used was estimated at 0.2, an acceptable value for this type of material (Fetter, 1994). The base elevation was set at 5500 feet amsl.

Constant head boundaries were placed to the west of the area of interest as well as in the eastern portions of the main tributary supplying water to the source well. The western constant head elevation was estimated at 6000 feet and the eastern constant head was estimated at 6400 feet amsl. No-flow boundaries were placed along the geologic boundaries separating units of rocks that are most likely not contributing to this system. Constant flux boundaries were added along the boundary between the alluvium and the uplands the border the area to the east. The value used on this constant flux boundary was -5 ft^2/day.

To account for growth in the area, a 1.5 multiplier was applied to the usage values. The estimated combined pumping rate used for the system was 273,315 ft^3/day. For the purpose of this report, Well #1 and Well #2 were modeled together under the assumption that both wells were operating at full capacity.

The model was then run over a series of simulations where aquifer parameters and model boundaries were adjusted to simulate a scenario that best matched test points within the area. The test point matches simulate the difference of the modeled values versus the actual values measured in the field.

The locations and elevations of the test points is based on the information taken from the well logs and a 1:24,000 topographic map, so a match within +/- 50 feet is a close approximation based on the fact that the elevation picked off of the topographic map could be over or underestimated by 25 feet fairly easily. Also, the locations on the topographic map are within a ¼, ¼ section, allowing for potentially more error in the elevation estimates. Finally, the difference in the water level elevations varies with time, as seasonal fluctuations and potentially decreasing water levels over time can create differences in the modeled heads versus the measured heads that need to be accounted for.

After a range of simulations were run that best-matched the test points, a combined result was drawn, and a standard buffer of 10 degrees added to the perimeter.

The delineated area for the Teton Creek Resort system is an eastward trending teardrop-shaped polygon approximately seven (7) miles long and one and a half (1.5) miles wide (Figure 2). The actual data used in determining the source water assessment delineation area is available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of groundwater contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

Land use within the area surrounding the Teton Creek Resort system is predominately irrigated agriculture.

It is important to understand that a release may never occur from a potential source of contamination provided they are using best management practices. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, including educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted in April 2005. The first phase involved identifying and documenting potential contaminant sources within the Teton Creek Resort source water assessment areas (Figure 2) through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to identify and add any additional potential sources in the delineated areas.

The delineated source water area for the system (Figure 2) has two potential contaminant sources; Alta Road and Teton Creek.

Section 3. Susceptibility Analyses

The well's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix A contains the susceptibility analysis worksheet. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone (aquitard) above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

Both wells rated high susceptibility for hydrologic sensitivity. According to the Natural Resource Conservation Service (NRCS), area soils are moderately-drained to well-drained. The well logs for Well #1 and Well #2 indicated that the vadose zone in each well is composed of predominantly permeable materials. In addition, both wells had a water table that is less than 300 feet deep, and neither well had an aquitard present above their producing zone.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then the potential for contamination from surface events is reduced.

According to its well log, Well #1 was drilled to a depth of 650 feet below ground surface (bgs). The screened intervals of the well were from 150 to 165 feet bgs and 182 to 202 feet bgs. This source well is cased with 8-inch steel (0.25 inches thick) to a depth of 150 feet bgs into alluvium material. A 6-inch slotted steel casing is welded to the 8-inch casing and extends to a depth of 213 feet bgs into limestone. The well is sealed with both bentonite and cement grout to a depth of 58 feet bgs and the wellhead extends roughly 18 inches above the ground surface. The static water level at the time of the well completion was 100 feet bgs.

According to its well log, Well #2 was drilled to a depth of 195 feet below ground surface (bgs). This source well is cased with 12-inch welded steel (0.25 inches thick) to a depth of 134 feet bgs into alluvium material. The well is sealed with bentonite, portland cement and sand/concrete grout to a depth of 71 feet bgs into alluvium material, and the wellhead extends roughly 12 inches above the ground surface.

Both wells rated moderate susceptibility for system construction. Both wells are located outside of a 100-year floodplain, and according to the 2005 Sanitary Survey, the wellhead and surface seal of each well are maintained. The moderate rating was received because neither the casing nor annular seal of either well extend into low permeability units, and the highest production does not come from more than 100 feet below static water levels in either well.

Current PWS well construction standards can be more stringent than when a well(s) was constructed. The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. Some of the regulations deal with screening requirements, aquifer pump tests, use of a down-turned casing vent, and thickness of casing. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells.

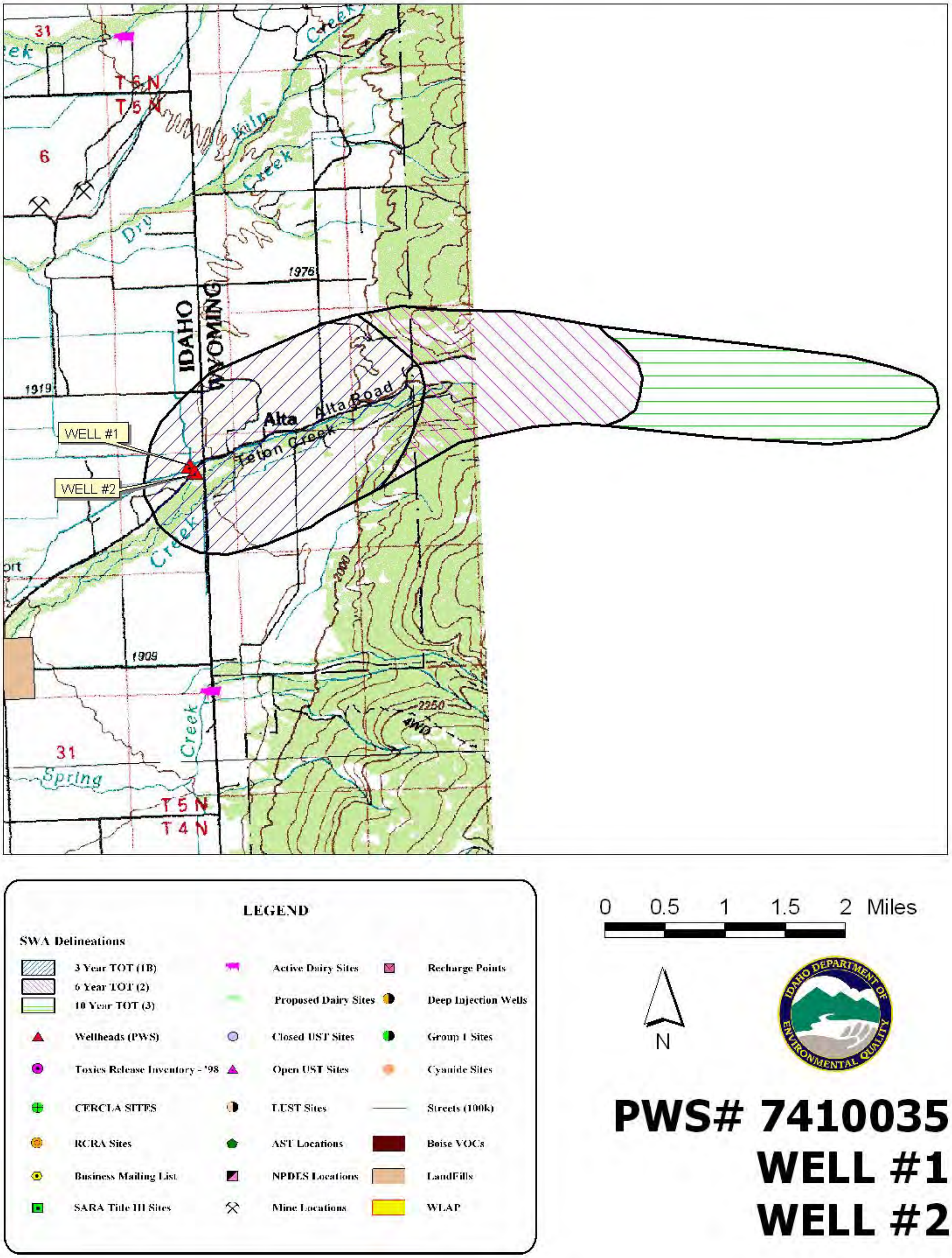
Regulations for steel pipe thickness based on size of pipe

Size of pipe (inches)	Thickness (inches)
≤6	0.280
8	0.322
10	0.365
12-20	0.375

Well tests are required at the design pumping rate for 24 hours or until stabilized drawdown has continued for at least six hours when pumping at 1.5 times the design pumping rate.

Both Well #1 and Well #2 received an additional system construction point because neither well meets all current construction standards.

Figure 2. Teton Creek Resort Delineation Map and Potential Contaminant Source Locations



Potential Contaminant Sources and Land Use

Land use for the system rated moderate susceptibility for IOCs, VOCs, SOCs, and low susceptibility for microbial contaminants. The agriculture activity within the delineation contributed the highest amount to the ratings.

Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a wellhead will automatically lead to a high susceptibility rating. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) contribute greatly to the overall ranking.

Table 1. Summary of Teton Creek Resort System (Well #1 and Well #2) Susceptibility Evaluation

	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	**Final Susceptibility Ranking**			
Well		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	H	M	M	M	L	M	H	H	H	H
Well #2	H	M	M	M	L	M	H	H	H	H

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

In terms of overall susceptibility, both Well #1 and Well #2 rated high for IOCs, VOCs, SOCs, and microbial bacteria. Both wells rated high susceptibility for hydrologic sensitivity and moderate susceptibility for system construction. Land use rated high susceptibility for IOCs, VOCs, and SOCs and low susceptibility for microbial bacteria (Table 1).

According to the State Drinking Water Information System (SDWIS), no IOCs, VOCs, SOCs, or microbial bacteria have ever been detected in Well #1. There is no data in SDWIS regarding Well #2, so it is unknown if any IOCs, VOCs, SOCs, or microbial bacteria are present in that well’s water.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the Teton Creek Resort, drinking water protection activities should first focus on correcting any deficiencies outlined in the sanitary survey. Actions should be taken to keep a 50-foot radius circle clear around the wellheads. Any spills within the delineation should be carefully monitored and dealt with. As much of the designated protection area is outside the direct jurisdiction of the Teton Creek Resort, making collaboration and partnerships with state and local agencies and industry groups are critical to the success of drinking water protection. The well should maintain sanitary standards regarding wellhead protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A public education program should be a primary focus of any drinking water protection plan as the delineation is near residential land uses areas. Public education topics could include proper household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Idaho Falls Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water suppliers and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Idaho Falls Regional DEQ Office	(208) 528-2650
State DEQ Office	(208) 373-0502

Website: http://www.state.id.us/deq

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper (mlharper@idahoruralwater.com), Idaho Rural Water Association, at 1-208-343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund≅ is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

References Cited

Department of Water Resources, Water Information Bulletin 30: p. 33-42.

Fetter, C.W., 1994. Applied Hydrogeology. Prentice Hall, New Jersey, 691pp**.**

Idaho Department of Agriculture, 1998. Unpublished Data.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Appendix A

Teton Creek Resort
Susceptibility Analysis
Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Susceptibility Worksheets for Well #1:

Public Water System Name:	Teton Resort Creek		
Public Water System Number:	7410035		
Well Number:	1		
Date:	5/9/2005		
Person Conducting Assessment:	Kathryn Dallas		
Hydrologic Sensitivity Worksheet			
			Value
Do the soils belong to drainage classes in the poorly drained through moderately well drained categories?	○ Yes	◉ No	2
Is the vadose zone composed predominantly of gravel, fractured rock; or is unknown?	◉ Yes	○ No	1
Is the depth to first groundwater greater than 300 feet?	○ Yes	◉ No	1
Is an aquitard present with silt/clay or sedimentary interbeds within basalt with greater than 50 feet cumulative thickness?	○ Yes	◉ No	2
	Hydrologic Sensitivity Score =		**6**
Final Hydrologic Sensitivity Ranking =	High Hydrologic Sensitivity Score (5 to 6 points)		

Public Water System Name:	Teton Creek Resort				Version 2.1			
Public Water System Number:	7410035				5/19/1999			
Well Number:	1							
Date:	5/9/2005							
Person Conducting Assessment:	Kathryn Dallas							

Potential Contaminant Source/Land Use Worksheet

Land Use/Zone IA					**IOC Score**	**VOC Score**	**SOC Score**	**Microbial Score**
Land Use (Pick the Predominant Land Type)	Irrigated Cropland				2	2	2	2
Is Farm Chemical Use High or Unknown? (Answer No if (1) = Urban/Commercial)	☐ Yes	☒ No			**Stop: Go Directly to Step 3**			
Indicate approriate chemical category	☐ IOCs ☐ VOCs ☐ SOCs				0	0	0	0
Are IOC, VOC, SOC, Microbial or Radionuclide contaminant sources Present in Zone IA? OR Have SOC/VOC contaminants been detected in the well? OR have IOC contaminants been detected above MCL levels in the well? If Yes, please check the appropriate chemical	☐ Yes ☒ IOCs ☐ VOCs ☒ SOCs ☒ Microbials	☒ No						
		Land Use Subtotal			**2**	**2**	**2**	**2**

Zone IB

Contaminant Sources Present in Zone IB?	(•) Yes	( ) No					
				IOC Score	VOC Score	SOC Score	Microbial Score
Number of Sources in Zone IB in Each Category?		# IOC Sources	2	4	4	4	4
(List sources by Category up to a Maximum of Four per Category)		# VOC Sources	2				
		# SOC Sources	2				
		# Microbial Sources	2				
Are there Sources of Class II or III Leachable Contaminants in Zone IB?	(•) Yes	( ) No		IOC Score	VOC Score	SOC Score	Microbial Score
(List Sources up to a Maximum of Four per Category)		# IOC Sources	1	1	1	1	0
		# VOC Sources	1				
		# SOC Sources	1				
Does a Group 1 Priority Area Intercept or Group 1 Priority Site Fall Within Zone IB?	( ) Yes ☐ IOCs ☐ SOCs	(•) No ☐ VOCs ☐ Microbials		0	0	0	0
Pick the Best Description of the Amount and Type of Agricultural Land in Zone IB.	Greater Than 50 % Irrigated Agricultural Land			4	4	4	4
		Zone IB Subtotal		9	9	9	8

Zone II			IOC Score	VOC Score	SOC Score	Microbial Score
Are Contaminant Sources Present in Zone II?	(•) Yes ( ) No	**Complete Step 9a**				
What types of chemicals?	[x] IOCs [x] VOCs [x] SOCs		2	2	2	0
Are there Sources of Class II or III Leachable Contaminants in Zone II?	(•) Yes ( ) No	**Complete Step 10a**				
What type of contaminant?	[x] IOCs [x] VOCs [x] SOCs		1	1	1	0
Pick the Best Description of the Amount and Type of Agricultural Land in Zone II.	Less Than 25% Agricultural Land		0	0	0	0
	Zone II Subtotal		**3**	**3**	**3**	**0**

Zone III			IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant Sources Present in Zone III?	◉ Yes ○ No	Complete Step 12a				
What types of contaminant?	☑ IOCs ☑ VOCs ☑ SOCs		1	1	1	0
Are there Sources of Class II or III Leachable Contaminants in Zone III?	◉ Yes ○ No	Complete Step 13a				
What types of contaminants?	☑ IOCs ☑ VOCs ☑ SOCs		1	1	1	0
Is there Irrigated Agricultural Land That Occupies > 50% of Zone III?	○ Yes ◉ No		0	0	0	0
	Zone III Subtotal		2	2	2	0

	IOC Score	VOC Score	SOC Score	Microbial Score
Community and Non-Community, Non-Transient System Contaminant Source/Land Use Score	16	16	16	10

Final Community/NC-NT System Ranking

IOC Score = Moderate Contaminant/Land Use Score (11 to 20 points)
VOC Score = Moderate Contaminant/Land Use Score (11 to 20 points)
SOC Score = Moderate Contaminant/Land Use Score (11 to 20 points)
Microbial Score = Low Contaminant/Land Use Score (0 to 10 points)

Public Water System Name:	Teton Resort Creek		
Public Water System Number:	7410035		
Well Number:	1		
Date:	5/9/2005		
Person Conducting Assessment:	Kathryn Dallas		

Source Construction Worksheet

			Year	Value
Well Drill Date	Input Date	January 16, 1998		
Well Drillers Log Available?	(•) Yes	( ) No		
Sanitary Survey Available? If Yes, for what year?	(•) Yes	( ) No	2005	
Are current IDWR well construction standards being met?		( ) Yes (•) No		1
Is the wellhead and surface seal maintained in good condition?		(•) Yes ( ) No		0
Do the casing and annular seal extend to a low permeability unit?		( ) Yes (•) No		2
Is the highest production interval of the well at least 100 feet below the static water level?		( ) Yes (•) No		1
Is the well located outside the 100 year floodplain and is it protected from surface runoff?		(•) Yes ( ) No		0
			Source Construction Score =	**4**
Final Source Construction Ranking =	Moderate Source Construction Score (2 to 4 poi			

Public Water System Name:	Teton Creek Resort
Public Water System Number:	7410035
Well Number:	1
Date:	5/9/2005
Person Conducting Assessment:	Kathryn Dallas

SWA Susceptibility Rating Sheet

Zone IA Susceptability Rating

Warning: Due to specific conditions found in Zone IA this well has been assigned a High overall susceptability for: No Contaminant Categories

This rating is based on: (1)The presence of contaminant sources in Zone IA or (2)The detection of specific SOC/VOC chemicals in the well or (3)The detection of specific IOC chemicals above MCL levels in the well.

Public Water Systems may petition IDEQ to revise susceptibility rating based on elimination of contaminant sources or other site-specific factors.

Community and Noncommunity-Nontransient Sources	IOC Score	SOC Score	VOC Score
Hydrologic Sensitivity Score =	6	6	6
Potential Contaminant Source/Land Use Score X 0.20 =	3	3	3
Source Construction Score =	4	4	4
Total	**13**	**13**	**13**

FINAL WELL RANKING

IOC Ranking is High (13 to 18 points)

SOC Ranking is High (13 to 18 points)

VOC Ranking is High (13 to 18 points)

Microbial Susceptibility Rating	Score
Hydrologic Sensitivity Score =	6
Potential Contaminant Source/Land Use Score X 0.375 =	4
Source Construction Score =	4
Total	**14**

FINAL WELL RANKING

Microbial Ranking is High (13 to 18 points)

Susceptibility Worksheets for Well #2:

Public Water System Name:	Teton Resort Creek		
Public Water System Number:	7410035		
Well Number:	2		
Date:	5/9/2005		
Person Conducting Assessment:	Kathryn Dallas		
Hydrologic Sensitivity Worksheet			
			Value
Do the soils belong to drainage classes in the poorly drained through moderately well drained categories?	○ Yes	◉ No	2
Is the vadose zone composed predominantly of gravel, fractured rock; or is unknown?	◉ Yes	○ No	1
Is the depth to first groundwater greater than 300 feet?	○ Yes	◉ No	1
Is an aquitard present with silt/clay or sedimentary interbeds within basalt with greater than 50 feet cumulative thickness?	○ Yes	◉ No	2
	Hydrologic Sensitivity Score =		**6**
Final Hydrologic Sensitivity Ranking =	High Hydrologic Sensitivity Score (5 to 6 points)		

Public Water System Name:	Teton Creek Resort	Version 2.1			
Public Water System Number:	7410035	5/19/1999			
Well Number:	2				
Date:	5/9/2005				
Person Conducting Assessment:	Kathryn Dallas				

Potential Contaminant Source/Land Use Worksheet

Land Use/Zone IA		**IOC Score**	**VOC Score**	**SOC Score**	**Microbial Score**
Land Use (Pick the Predominant Land Type)	Irrigated Cropland	2	2	2	2
Is Farm Chemical Use High or Unknown? (Answer No if (1) = Urban/Commercial)	○ Yes ◉ No	**Stop: Go Directly to Step 3**			
Indicate appropriate chemical category	☐ IOCs ☐ VOCs ☐ SOCs	0	0	0	0
Are IOC, VOC, SOC, Microbial or Radionuclide contaminant sources Present in Zone IA? OR Have SOC/VOC contaminants been detected in the well? OR have IOC contaminants been detected above MCL levels in the well? If Yes, please check the appropriate chemical	○ Yes ◉ No ☑ IOCs ☐ VOCs ☑ SOCs ☑ Microbials				
	Land Use Subtotal	**2**	**2**	**2**	**2**

Zone IB

				IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant Sources Present in Zone IB?	(•) Yes	( ) No					
Number of Sources in Zone IB in Each Category?		# IOC Sources	2	4	4	4	4
(List sources by Category up to a Maximum of Four per Category)		# VOC Sources	2				
		# SOC Sources	2				
		# Microbial Sources	2				

				IOC Score	VOC Score	SOC Score	Microbial Score
Are there Sources of Class II or III Leachable Contaminants in Zone IB?	(•) Yes	( ) No					
(List Sources up to a Maximum of Four per Category)		# IOC Sources	1	1	1	1	0
		# VOC Sources	1				
		# SOC Sources	1				
Does a Group 1 Priority Area Intercept or Group 1 Priority Site Fall Within Zone IB?	( ) Yes ☐ IOCs ☐ VOCs ☐ SOCs ☐ Microbials	(•) No		0	0	0	0
Pick the Best Description of the Amount and Type of Agricultural Land in Zone IB.	Greater Than 50 % Irrigated Agricultural Land			4	4	4	4
		Zone IB Subtotal		9	9	9	8

Zone II			IOC Score	VOC Score	SOC Score	Microbial Score
Are Contaminant Sources Present in Zone II?	(●) Yes	( ) No	Complete Step 9a				
What types of chemicals?	[x] IOCs [x] VOCs [x] SOCs			2	2	2	0
Are there Sources of Class II or III Leachable Contaminants in Zone II?	(●) Yes	( ) No	Complete Step 10a				
What type of contaminant?	[x] IOCs [x] VOCs [x] SOCs			1	1	1	0
Pick the Best Description of the Amount and Type of Agricultural Land in Zone II.	Less Than 25% Agricultural Land			0	0	0	0
		Zone II Subtotal		3	3	3	0

Zone III				IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant Sources Present in Zone III?	◉ Yes	○ No	Complete Step 12a				
What types of contaminant?	☑ IOCs ☑ VOCs ☑ SOCs			1	1	1	0
Are there Sources of Class II or III Leachable Contaminants in Zone III?	◉ Yes	○ No	Complete Step 13a				
What types of contaminants?	☑ IOCs ☑ VOCs ☑ SOCs			1	1	1	0
Is there Irrigated Agricultural Land That Occupies > 50% of Zone III?	○ Yes	◉ No		0	0	0	0
		Zone III Subtotal		2	2	2	0

				IOC Score	VOC Score	SOC Score	Microbial Score
Community and Non-Community, Non-Transient System Contaminant Source/Land Use Score				16	16	16	10

Final Community/NC-NT System Ranking	IOC Score = Moderate Contaminant/Land Use Score (11 to 20 points)
	VOC Score = Moderate Contaminant/Land Use Score (11 to 20 points)
	SOC Score = Moderate Contaminant/Land Use Score (11 to 20 points)
	Microbial Score = Low Contaminant/Land Use Score (0 to 10 points)

Public Water System Name:	Teton Resort Creek		
Public Water System Number:	7410035		
Well Number:	2		
Date:	5/9/2005		
Person Conducting Assessment:	Kathryn Dallas		

Source Construction Worksheet

Well Drill Date	Input Date	January 16, 1998		
Well Drillers Log Available?	(●) Yes	( ) No		
			Year	
Sanitary Survey Available? If Yes, for what year?	(●) Yes	( ) No	2005	
				Value
Are current IDWR well construction standards being met?		( ) Yes (●) No		1
Is the wellhead and surface seal maintained in good condition?		(●) Yes ( ) No		0
Do the casing and annular seal extend to a low permeability unit?		( ) Yes (●) No		2
Is the highest production interval of the well at least 100 feet below the static water level?		( ) Yes (●) No		1
Is the well located outside the 100 year floodplain and is it protected from surface runoff?		(●) Yes ( ) No		0
		Source Construction Score =		**4**
Final Source Construction Ranking =	Moderate Source Construction Score (2 to 4 poi			

Public Water System Name:	Teton Creek Resort
Public Water System Number:	7410035
Well Number:	2
Date:	5/9/2005
Person Conducting Assessment:	Kathryn Dallas

SWA Susceptibility Rating Sheet

Zone IA Susceptability Rating

Warning: Due to specific conditions found in Zone IA this well has been assigned a High overall susceptability for:	No Contaminant Categories
This rating is based on: (1)The presence of contaminant sources in Zone IA or (2)The detection of specific SOC/VOC chemicals in the well or (3)The detection of specific IOC chemicals above MCL levels in the well.	
Public Water Systems may petition IDEQ to revise susceptibility rating based on elimination of contaminant sources or other site-specific factors.	

Community and Noncommunity-Nontransient Sources	IOC Score	SOC Score	VOC Score
Hydrologic Sensitivity Score =	6	6	6
Potential Contaminant Source/Land Use Score X 0.20 =	3	3	3
Source Construction Score =	4	4	4
Total	**13**	**13**	**13**

FINAL WELL RANKING

IOC Ranking is High (13 to 18 points)

SOC Ranking is High (13 to 18 points)

VOC Ranking is High (13 to 18 points)

Microbial Susceptibility Rating	Score
Hydrologic Sensitivity Score =	6
Potential Contaminant Source/Land Use Score X 0.375 =	4
Source Construction Score =	4
Total	**14**

FINAL WELL RANKING

Microbial Ranking is High (13 to 18 points)

Appendix B

Table 2
Potential Contaminant Inventories

Table 2. Teton Creek Resort, Well #1 and Well #2, Potential Contaminant Inventory

SITE	Source Description[1]	TOT[2] ZONE	Source of Information	Potential Contaminants[3]
	Alta Road	0-10 YR	GIS Map	VOC, SOC, IOC, microbial bacteria
	Teton Creek	0-10 YR	GIS Map	VOC, SOC, IOC, microbial bacteria

[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, SOC = synthetic organic chemical, VOC = volatile organic chemical